## SEQUENCE LISTING

- <110> Duvick, Jonathan P. Gilliam, Jacob T. Maddox, Joyce R. Rao, Aragula Gururaj Crasta, Oswald R. Folkerts, Otto
- <120> Amino Polyol Amine Oxidase Polynucleotides and Related Polypeptides and Methods of Use
- <130> 1134R

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- <150> US 60,092,936
- <151> 1998-07-25
- <150> US 60.135,391
- <151> 1999-05-21
- <150> US 09/352,159
- <151> 1999-07-12
- <150> US 09/352,168
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	gca l Ala															3	384
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Gln Ser Ser Cys Asp Pro Ile Ser Phe Ala Arg Asp Thr Ser Ile Asp
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Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp
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Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
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Gly Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly
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Ser Ala Leu Arg Thr Pro Phe Lys Ser Val His Phe Val Gly Thr Glu
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gat Asp	gtt Val -40	Ala	gtt Val	ttg Leu	cca Pro	ttt Phe -35	tcc Ser	aac Asn	agc Ser	aca Thr	aat Asn -30	aac Asn	Gly	tta Leu	ttg Leu	192
ttt Phe -25	ata Ile	aat Asn	act Thr	act Thr	att Ile -20	gcc Ala	agc Ser	att Ile	gct Ala	gct Ala -15	aaa Lys	gaa Glu	gaa Glu	ggg Gly	gta Val -10	240
tct Ser	ctc Leu	gag Glu	aaa Lys	aga Arg -5	gag Glu	gct Ala	gaa Glu	gct Ala	gaa Glu 1	ttc Phe	aaa Lys	gac Asp	aac Asn 5	gtt Val	gcg Ala	288
gac Asp	gtg Val	gta Val 10	gtg Val	gtg Val	ggc Gly	gct Ala	ggc Gly 15	ttg Leu	agc Ser	ggt Gly	ttg Leu	gag Glu 20	acg Thr	gca Ala	cgc Arg	33ñ
aaa Lys	gtc Val 25	cag Gln	gcc Ala	gcc Ala	ggt Gly	ctg Leu 30	tcc Ser	tgc Cys	ctc Leu	gtt Val	ctt Leu 35	gag Glu	gcg Ala	atg Met	gat Asp	384
cgt Arg 40	gta Val	Gly aaa	gga Gly	aag Lys	act Thr 45	ctg Leu	agc Ser	gta Val	caa Gln	tcg Ser 50	ggt Gly	ccc Pro	ggc Gly	agg Arg	acg Thr 55	432
act Thr	atc Ile	aac Asn	gac Asp	ctc Leu 60	ggc Gly	gct Ala	gcg Ala	tgg Trp	atc Ile 65	aat Asn	gac Asp	agc Ser	aac Asn	caa Gln 70	agc Ser	480
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ctt Leu 120	gcg Ala	gaa Glu	ctc Leu	ctc Leu	ccc Pro 125	gta Val	tgg Trp	tct Ser	cag Gln	ctg Leu 130	atc Ile	gaa Glu	gag Glu	cat His	agc Ser 135	672
ctt Leu	caa Gln	gac Asp	ctc Leu	aag Lys 140	gcg Ala	agc Ser	cct Pro	cag Gln	gcg Ala 145	aag Lys	cgg Arg	ctc Leu	gac Asp	agt Ser 150	gtg Val	720
						gag Glu										768
ggc	gta	gca	aac	cag	atc	aca	cgc	gct	ctg	ctc	ggt	gtg	gaa	gcc	cac	816

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	-				_	-	-		_			cag Gln				910
~				_	_	_				-	_	tca Ser	_	_		960
												gaa Glu				1003
-			55			_	_	_	_	~		gcc Ala 260			-	1056
												tat Tyr				110÷
												ttg Leu				1152
		_				_	~				_	tgg Trp	_	-		1200
												tcg Ser				1248
												gat Asp 340				1296
												aag Lys				1344
												caa Gln				1392
												gcc Ala				1440
												gct Ala				1488

						ctc Leu										1536
ccg Pro	ttc Phe 425	aag Lys	agt Ser	gtt Val	cat His	ttc Phe 430	gtt Val	gga Gly	acg Thr	gag Glu	acg Thr 435	tct Ser	tta Leu	gtt Val	tgg Trp	1584
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Ala	Leu	Ala	Ala -70	Pro	Val	Asn	Thr	Thr	Thr	Glu	Asp	Glu	Thr	Ala	Gln	
Ile	Pro	Ala -55	Glu	Ala	Val	Ile	Gly -50	Tyr	Ser	Asp	Leu	Glu -45		Asp	Phe	
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Phe -25		Asn	Thr	Thr	Ile -20	Ala	Ser	Ile	Ala	Ala -15		Glu	Glu	Gly	Val -10	
-	Leu	Glu	Lys	Arg -5	Glu	Ala				Phe	_	_	Asn 5	Val		
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Lys	Val 25		Ala	Ala	Gly	Leu 30		Cys	Leu	Val	Leu 35		Ala	Met	Asp	
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Glu	Val	Ser	Arg 75		Phe	Glu	Arg	Phe 80		Leu	Glu	Gly	Glu 85		Gln	
Arg	Thr	Thr 90		Asn	Ser	Ile	His 95		Ala	Gln	Asp	Gly 100		Thr	Thr	
Thr	Ala 105		Tyr	Gly	Asp	Ser 110		Leu	Ser	Glu	Glu 115		Ala	Ser	Ala	
Leu 120		Glu	Leu	Leu	Pro 125	Val	Trp	Ser	Gln	Leu 130		Glu	Glu	His	Ser 135	
	Gln	Asp	Leu	Lys		Ser	Pro	Gln	Ala		Arg	Leu	Asp	Ser		
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Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly Gln Tyr Met Arg
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                                     210
Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu
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                                  225
Val Pro Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln
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           235
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Ser Ala Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Ala Val Phe Arg
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                                             260
       250
Ser Lys Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu
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Thr Phe Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn
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                                 305
Trp Trp Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp
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Ser Ile Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln
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Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala
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Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala
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                              400
Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr
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Pro Phe Lys Ser Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp
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<212> DNA

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<220>

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	<.!	.:2>	(688	3)	ature (690 ysine	))											
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	cga Arg															96	,
	gag Glu															144	:
	ttg Leu 50															192	
	aca Thr															240	J
	ttg Leu															288	ļ
	gcg Ala															336	j
aaa Lys	gac Asp	ttt Phe 115	gaa Glu	act Thr	ctc Leu	aaa Lys	gtt Val 120	gat Asp	ttt Phe	ctt Leu	agc Ser	aag Lys 125	cta Leu	cct Pro	gaa Glu	384	ļ
	ctg Leu 130															432	}
	gat Asp															480	)
	gtt Val															528	}
	tgt Cys															576	5

_			_	_	tat Tyr		-			_	-				_	624
_		~ ~			gac Asp					-	_	_	_	-		67:
		_	-		aaa Lys 230	_		-		-		_	-	-		720
_		-			ttg Leu		-	-	-		-	-				763
_		-		_	ctt Leu			_	_	-	-			_		816
	_	_		_	ggt Gly				_				_			864
					gac Asp											912
					gag Glu 310											960
					gac Asp											1008
	-	_	_		gag Glu											1056
-	-				atc Ile											1104
					cgg Arg											1152
					ttg Leu 390											1200
					ggt Gly											1248
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					atg Met											1392
					gct Ala 470											1440
					ggc Gly											1488
					ttg Leu											1536
					gca Ala											1584
					gta Val											1632
					caa Gln 550											1680
					gtc Val											1728
gtc Val	gga Gly	gac Asp	ccg Pro 580	gga Gly	cgg Arg	aag Lys	tgg Trp	tcc Ser 585	caa Gln	cag Gln	tcc Ser	aag Lys	cag Gln 590	gta Val	cga Arg	1776
					gac Asp											1824
					ccg Pro											1872
					gga Gly 630											1920
					tcg Ser											1968

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gcc Ala	ata Ile	cga Arg 675	Ser	ggt Gly	caa Gln	cga Arg	ggt Gly 680	gct Ala	gca Ala	gaa Glu	gtt Val	gtg Val 685	gct Ala	agc Ser	ctg Leu	2:064
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Val	Cys	Phe	Lys 180		Arg	Ile	Glu		170 Ile	Pro	Gln	Ile		175 Lys	Tyr	
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Thr	Phe 210		Gly	Gly	Asp		200 Pro	Pro	Lys	Ser		205 Leu	Val	Pro	Arg	
Gly		Pro	Glu	Phe		215 Asp	Asn	Val	Ala		220 Val	Val	Val	Val		
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Leu	Ser	Cys	Leu	245 Val	Leu	Glu	Ala		250 Asp	Arg	Val	Gly		255 Lys	Thr	
Leu	Ser		260 Gln	Ser	Gly	Pro		265 Arg	Thr	Thr	Ile		270 Asp	Leu	Gly	
Ala		275 Trp	Ile	Asn			280 Asn	Gln	Ser	Glu	Val	285 Ser	Arg	Leu	Phe	
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Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala Pro Tyr Gly Asp
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Val Trp Ser Gln Leu Ile Glu Glu His Ser Leu Gln Asp Leu Lys Ala
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Glu Lys Glu Leu Asn Leu Pro Ala Val Leu Gly Val Ala Asn Gln Ile
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Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile Ser Met Leu Phe
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                                    410
Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser
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Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys Thr Gly Met Gln
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Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe Ser Pro Pro Leu
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Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile Ser Phe Ala Arg
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Asp Thr Ser Ile Asp Val Asp Arg Gln Trp Ser Ile Thr Cys Phe Met
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Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg
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Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly
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Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys
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Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp
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Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly Tyr Met Glu Gly
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<213> Unknown

<sup>&</sup>lt;223> Nucleotide sequence of K:trAPAO translational

fusion with barley alpha amylase signal sequence, for expression and secretion of the mature trAPAO in maize. Nucleotides 1-72, barley alpha amylase signal sequence, nucleotides 73-75, added lysine residue; nucleotides 76-1464, trAPAO cDNA.

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	ctg tcc tgc ctc Leu Ser Cys Leu 30			
	ctg agc gta caa Leu Ser Val Gln 45			
	gct gcg tgg atc Ala Ala Trp Ile 60			
	gaa aga ttt cat Glu Arg Phe His			
	atc cat caa gca Ile His Gln Ala 95			
	tcc ttg ctg agc Ser Leu Leu Ser 110			

ctc Leu	ctc Leu	ccc Pro	gta Val	tgg Trp 125	Ser	cag Gln	ctg Leu	atc Ile	gaa Glu 130	gag Glu	cat His	agc Ser	ctt Leu	caa Gln 135	gac Asp	480
ctc Leu	aag Lys	gcg Ala	agc Ser 140	cct Pro	cag Gln	gcg Ala	aag Lys	cgg Arg 145	ctc Leu	gac Asp	agt Ser	gtg Val	agc Ser 150	ttc Phe	gcg Ala	528
cac His	tac Tyr	tgt Cys 155	gag Glu	aag Lys	gaa Glu	cta Leu	aac Asn 160	ttg Leu	cct Pro	gct Ala	gtt Val	ctc Leu 165	ggc Gly	gta Val	gca Ala	576
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ggt Gly	atg Met	cag Gln	tcg Ser 220	att Ile	tgc Cys	cat His	gcc Ala	atg Met 225	tca Ser	aag Lys	gaa Glu	ctt Leu	gtt Val 230	cca Pro	ggc Gly	768
tca Ser	gtg Val	cac His 235	ctc Leu	aac Asn	acc Thr	ccc Pro	gtc Val 240	gct Ala	gaa Glu	att Ile	gag Glu	cag Gln 245	tcg Ser	gca Ala	tcc Ser	816
ggc Gly	tgt Cys 250	aca Thr	gta Val	cga Arg	tcg Ser	gcc Ala 255	tcg Ser	ggc Gly	gcc Ala	gtg Val	ttc Phe 260	cga Arg	agc Ser	aaa Lys	aag Lys	864
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cca Pro	cct Pro	ctt Leu	ccc Pro	gcc Ala 285	gag Glu	aag Lys	caa Gln	gca Ala	ttg Leu 290	gcg Ala	gaa Glu	aat Asn	tct Ser	atc Ile 295	ctg Leu	960
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ttt Phe	gcc Ala 330	aga Arg	gat Asp	acc Thr	agc Ser	atc Ile 335	gac Asp	gtc Val	gat Asp	cga Arg	caa Gln 340	tgg Trp	tcc Ser	att Ile	acc Thr	1104
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Cys 345	Phe	Met	Val	Gly	Asp 350		Gly	Arg	Lys	Trp 355		Gln	Gln	Ser	Lys 360	
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aac Asn	gcc Ala	GJÀ aaa	gcc Ala 380	caa Gln	gtc Val	cca Pro	gag Glu	ccg Pro 385	gcc Ala	aac Asn	gtg Val	ctc Leu	gaa Glu 390	atc Ile	gag Glu	1348
tgg Trp	tcg Ser	aag Lys 395	cag Gln	cag Gln	tat Tyr	ttc Phe	caa Gln 400	gga Gly	gct Ala	ccg Pro	agc Ser	gcc Ala 405	gtc Val	tat Tyr	Gly aaa	1296
ctg Leu	aac Asn 410	gat Asp	ctc Leu	atc Ile	aca Thr	ctg Leu 415	ggt Gly	tcg Ser	gcg Ala	ctc Leu	aga Arg 420	acg Thr	ccg Pro	ttc Phe	aag Lys	1344
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Tyr	Asn	Ala 395	Thr	Phe	Glu	Asn	Leu 400	Glu		Phe	Pro	Gly 405			Val
Tyr	His	Ser	Ser	Glu	Val	Gly 415	Met		Phe	Gly	Thr 420	Tyr	Pro	Val	Ala
Ser 425	Ala		Ala	Leu	Glu 430	Ala		Thr	Ser	Lys 435			Gln	Gly	Ala 440
Trp	Ala	Ala	Phe	Ala 445	Lys		Pro	Met	Asn 450		Pro	Gly	Trp	Lys 455	Gln
Val	Pro	Asn	Val 460	Ala		Leu	Gly	Ser 465		Gly	Lys	Ala	Ile 470	Gln	Val
Asp	Val	Ser 475	Pro		Thr	Ile	Asp	Gln	Arg	Cys	Ala	Leu 485		Thr	Arg
Tyr	Tyr 490	Thr	Glu	Leu	Gly	Thr 495	Ile		Pro	Arg	Thr 500		Gly	Gly	Gly
Ser 505	Gly	Gly	Gly	Ser	Gly 510	Gly	Gly	Ser	Lys	Asp 515		Val	Ala	Asp	Val 520
Val	Val	Val	Gly	Ala 525	Gly	Leu	Ser	Gly	Leu 530		Thr	Ala	Arg	Lys 535	Val
Gln	Ala	Ala	Gly 540	Leu	Ser	Cys	Leu	Val 545		Glu	Ala	Met	Asp 550		Val
Gly	Gly	Lys 555	Thr	Leu	Ser	Val	Gln 560	Ser	Gly	Pro	Gly	Arg 565		Thr	Ile
Asn	Asp 570	Leu	Gly	Ala	Ala	Trp 575	Ile	Asn	Asp	Ser	Asn 580		Ser	Glu	Val
Ser 585	Arg	Leu	Phe	Glu	Arg 590	Phe	His	Leu	Glu	Gly 595		Leu	Gln	Arg	Thr 600
Thr	Gly	Asn	Ser	Ile 605	His	Gln	Ala	Gln	Asp 610	Gly	Thr	Thr	Thr	Thr 615	
Pro	Tyr	Gly	Asp 620	Ser	Leu	Leu	Ser	Glu 625	Glu	Val	Ala	Ser	Ala 630	Leu	Ala
Glu	Leu	Leu 635	Pro	Val	Trp	Ser	Gln 640	Leu	Ile	Glu	Glu	His 645	Ser	Leu	Gln
Asp	Leu 650	Lys	Ala	Ser	Pro	Gln 655	Ala	Lys	Arg	Leu	Asp 660	Ser	Val	Ser	Phe
Ala 665	His	Tyr	Cys	Glu	Lys 670	Glu	Leu	Asn	Leu	Pro 675	Ala	Val	Leu	Gly	Val 680
Ala	Asn	Gln	Ile	Thr 685	Arg	Ala	Leu	Leu	Gly 690	Val	Glu	Ala	His	Glu 695	Ile
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			Thr	765					770					775	Lys
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ctc Leu	tcc Ser	gcc Ala	tcc Ser -5	Leu	gcc Ala	agc Ser	ggc Gly	acg Thr 1	gat Asp	ttt Phe	ccg Pro	gtc Val 5	cgc Arg	agg Arg	acc Thr	96
gat Asp	ctg Leu 10	ggc Gly	cag Gln	gtt Val	cag Gln	gga Gly 15	ctg Leu	gcc Ala	ggg	gac Asp	gtg Val 20	atg Met	agc Ser	ttt Phe	cgc Arg	144
gga Gly 25	ata Ile	ccc Pro	tat Tyr	gca Ala	gcg Ala 30	ccg Pro	ccg Pro	gtg Val	ggc Gly	ggg Gly 35	ctg Leu	cgt Arg	tgg Trp	aag Lys	ccg Pro 40	192
ccc Pro	caa Gln	cac His	gcc Ala	cgg Arg 45	ccc Pro	tgg Trp	gcg Ala	ggc Gly	gtt Val 50	cgc Arg	ccc Pro	gcc Ala	acc Thr	caa Gln 55	ttt Phe	240
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ccc Pro	ggc Gly	gtg Val 75	agc Ser	gag Glu	gac Asp	tgt Cys	ctt Leu 80	tac Tyr	ctc Leu	aac Asn	gta Val	tgg Trp 85	gcg Ala	ccg Pro	tca Ser	336
ggc Gly	gct Ala 90	aaa Lys	ccc Pro	ggc Gly	cag Gln	tac Tyr 95	ccc Pro	gtc Val	atg Met	gtc Val	tgg Trp 100	gtc Val	tac Tyr	ggc Gly	ggc Gly	384
ggc Gly 105	ttc Phe	gcc Ala	ggc Gly	ggc Gly	acg Thr 110	gcc Ala	gcc Ala	atg Met	ccc Pro	tac Tyr 115	tac Tyr	gac Asp	ggc Gly	gag Glu	gcg Ala 120	432
ctt Leu	gcg Ala	cga Arg	cag Gln	ggc Gly 125	gtc Val	gtc Val	gtg Val	gtg Val	acg Thr 130	ttt Phe	aac Asn	tat Tyr	cgg Arg	acg Thr 135	aac Asn	480
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tgg Trp	gtg Val 170	cag Gln	agc Ser	aac Asn	gcc Ala	cgc Arg 175	gcc Ala	ttc Phe	gga Gly	Gly ggg	gac Asp 180	ccc Pro	ggc Gly	cga Arg	gtg Val	624
200		+++	aat	~~~	+ ~~	~~~	~~~	aca	agc	aca	a + a	~~~	att	ata		672

	ccg Pro														720
	ctg Leu														768
	cgc Arg 235														816
_	ctg Leu	_	-	~	-	_		_	-	_	_	_		-	864
	agg Arg														912
	acc Thr														960
	ctg Leu														1008
	ccg Pro 315														1056
	ggc Gly														1104
	 gcc Ala	_		_	-	-	-		_				_		1152
	aat Asn														1200
	ccc Pro														1248
	 ccg Pro 395	-													1296
	ctc Leu														1344
	gcc Ala														1392

425					430					435					440	
cgg t Arg E		-	_			_		_		-						1440
gcc t Ala T			-		_	-		_					-		-	1488
gcg g Ala A	-			-								_		_		1536
gcc a Ala I 4	_						_		-		-		-		-	1584
aaa g Lys A 505																1632
ttg g Leu G																1680
ctt g Leu G																1728
ggt c Gly F				-				-			_					1776
gac a Asp 5	_			-	-	_		_	_		-	_			_	1824
gag g Glu G 585				-		_								-		1872
gac g Asp G						_				-		_	-	-		1920
gag g Glu V																1968
atc g Ile G																2016
cgg c Arg I																2064

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				tgc Cys										2256
				gtt Val										2304
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				agc Ser										2400
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				tct Ser								_	_	2496
				tgg Trp										2544
				ccc Pro 830										2592
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	_			cag Gln	-	_	_	_		_				2688
				gcc Ala										2736
				gaa Glu										2784

890 895 900 gga gct ccg agc gcc gtc tat ggg ctg aac gat ctc atc aca ctg ggt 2832 Gly Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly 910 915 tcg gcg ctc aga acg ccg ttc aag agt gtt cat ttc gtt gga acg gag 2880 Ser Ala Leu Arg Thr Pro Phe Lys Ser Val His Phe Val Gly Thr Glu 925 930 acg tct tta gtt tgg aaa ggg tat atg gaa ggg gcc ata cga tcg ggt 2928 Thr Ser Leu Val Trp Lys Gly Tyr Met Glu Gly Ala Ile Arg Ser Gly 940 945 caa cga ggt gct gca gaa gtt gtg gct agc ctg gtg cca gca gca 2973 Gln Arg Gly Ala Ala Glu Val Val Ala Ser Leu Val Pro Ala Ala 960 tag 2976 <210> 27 <211> 991 <212> PRT <213> Unknown <220> <221> SIGNAL <222> (1)...(24) <400> 27 Met Ala Asn Lys His Leu Ser Leu Ser Leu Phe Leu Val Leu Leu Gly -20Leu Ser Ala Ser Leu Ala Ser Gly Thr Asp Phe Pro Val Arg Arg Thr Asp Leu Gly Gln Val Gln Gly Leu Ala Gly Asp Val Met Ser Phe Arg Gly Ile Pro Tyr Ala Ala Pro Pro Val Gly Gly Leu Arg Trp Lys Pro 30 35 Pro Gln His Ala Arg Pro Trp Ala Gly Val Arg Pro Ala Thr Gln Phe

 Asp
 Leu
 Gly
 Gly
 Leu
 Ala
 Gly
 Asp
 Val
 Met
 Ser
 Phe
 Arg

 Gly
 Ile
 Pro
 Tyr
 Ala
 Ala
 Pro
 Pro
 Val
 Gly
 Gly
 Leu
 Arg
 Trp
 Lys
 Pro

 25
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 Tyr
 Ala
 Ala
 Pro
 Tyr
 Ala
 Arg
 Pro
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 Pro
 Gln
 His
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 Arg
 Pro
 Trp
 Ala
 Gly
 Val
 Arg
 Pro
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 Thr
 Gln
 Phe
 Ala
 Ala
 Ala
 Tyr
 Leu
 Arg
 Lys
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 Ala
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 Fro
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 Arg
 Lys
 Bro
 Ser
 Leu
 Arg
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 Arg
 Lys
 Lys
 Pro
 Ser
 Leu
 Arg
 Leu
 Arg
 Lys
 Arg
 Gly
 Gly

Gly Thr Ser Gly Asn Tyr Gly Leu Leu Asp Ile Leu Ala Ala Leu Arg
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Trp Val Gln Ser Asn Ala Arg Ala Phe Gly Gly Asp Pro Gly Arg Val
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175

180

Thr Val Phe Gly Glu Ser Ala Gly Ala Ser Ala Ile Gly Leu Leu Leu 185 190 195 200

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 Ala Thr Leu Met Ala Arg Ala Asp Ala Ala Arg Pro Ala Ser Arg Asp
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 Pro Gln Thr Asp Ser Ala Ala Ile Ala Ala Gly Gln Leu Ala Pro Val
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                                     290
Arg Val Leu Ile Gly Thr Asn Ala Asp Glu Gly Arg Ala Phe Leu Gly
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Gln Phe Gly Asp Gln Ala Ala Ala Val Ala Ala Cys Tyr Pro Leu Asp
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Gly Arg Ala Thr Pro Lys Glu Met Val Ala Arg Ile Phe Gly Asp Asn
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Gln Phe Asn Arg Gly Val Ser Ala Phe Ser Glu Ala Leu Val Arg Gln
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Gly Ala Pro Val Trp Arg Tyr Gln Phe Asn Gly Asn Thr Glu Gly Gly
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Arg Ala Pro Ala Thr His Gly Ala Glu Ile Pro Tyr Val Phe Gly Val
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Phe Lys Leu Asp Glu Leu Gly Leu Phe Asp Trp Pro Pro Glu Gly Pro
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Thr Pro Ala Asp Arg Ala Leu Gly Gln Leu Met Ser Ser Ala Trp Val
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Arg Phe Ala Lys Asn Gly Asp Pro Ala Gly Asp Ala Leu Thr Trp Pro
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Ala Tyr Ser Thr Gly Lys Ser Thr Met Thr Phe Gly Pro Glu Gly Arg
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Ala Ala Val Val Ser Pro Gly Pro Ser Ile Pro Pro Cys Ala Asp Gly
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Ala Lys Ala Gly Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Ser
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Lys Asp Asn Val Ala Asp Val Val Val Gly Ala Gly Leu Ser Gly
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Leu Glu Ala Met Asp Arg Val Gly Gly Lys Thr Leu Ser Val Gln Ser
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Gly Pro Gly Arg Thr Thr Ile Asn Asp Leu Gly Ala Ala Trp Ile Asn
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Glu Gly Glu Leu Gln Arg Thr Thr Gly Asn Ser Ile His Gln Ala Gln
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Asp Gly Thr Thr Thr Ala Pro Tyr Gly Asp Ser Leu Leu Ser Glu
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Glu Val Ala Ser Ala Leu Ala Glu Leu Leu Pro Val Trp Ser Gln Leu
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Ile Glu Glu His Ser Leu Gln Asp Leu Lys Ala Ser Pro Gln Ala Lys
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Arg Leu Asp Ser Val Ser Phe Ala His Tyr Cys Glu Lys Glu Leu Asn
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Lys Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly
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Gly Glr. Tyr Met Arg Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala
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Met Ser Lys Glu Leu Val Pro Gly Ser Val His Leu Asn Thr Pro Val
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Ala Glu Ile Glu Gln Ser Ala Ser Gly Cys Thr Val Arg Ser Ala Ser
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Gly Ala Val Phe Arg Ser Lys Lys Val Val Val Ser Leu Pro Thr Thr
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Leu Tyr Pro Thr Leu Thr Phe Ser Pro Pro Leu Pro Ala Glu Lys Gln
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Ala Leu Ala Glu Asn Ser Ile Leu Gly Tyr Tyr Ser Lys Ile Val Phe
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Asp Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly Ala Gln Val Pro Glu
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Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
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														gaa Glu		144
														gtt Val		192
														cac His		240
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														tat Tyr		336
														cct Pro		384
-	_													tta Leu		432
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gtt	gtt	tta	tac	atg	gac	сса	atg	tgc	ctg	gat	gcg	ttc	сса	aaa	tta	528

Val	Val	Leu	Tyr	Met 165	Asp	Pro	Met	Cys	Leu 170	Asp	Ala	Phe	Pro	Lys 175	Leu	
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					tat Tyr											624
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					act Thr											768
					ttt Phe											816
					tgg Trp											864
					caa Gln											912
					aat Asn 310											960
					aac Asn											1008
aaa Lys	gcc Ala	gtc Val	atg Met 340	gtt Val	tgg Trp	ata Ile	tac Tyr	ggt Gly 345	gga Gly	gcg Ala	ctg Leu	gaa Glu	tat Tyr 350	ggt Gly	tgg Trp	1056
					tac Tyr											1104
					atc Ile											1152
					cca Pro 390											1200

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ggt Gly	gat Asp	cct Pro	cga Arg 420	Lys	gtc Val	aca Thr	ata Ile	ttt Phe 425	ggg	cag Gln	agt Ser	gcg Ala	ggg Gly 430	Gly	aga Arg	12	296
agt Ser	gtc Val	gac Asp 435	gtc Val	ctc Leu	ttg Leu	acg Thr	tct Ser 440	atg Met	cca Pro	cac His	aac Asn	cca Pro 445	ccc Pro	ttc Phe	cga Arg	13	344
gca Ala	gca Ala 450	atc Ile	atg Met	gag Glu	tcc Ser	ggt Gly 455	gtg Val	gct Ala	aac Asn	tac Tyr	aac Asn 460	ttc Phe	ccc Pro	aag Lys	gga Gly	13	92
gat Asp 465	ttg Leu	tcc Ser	gaa Glu	cct Pro	tgg Trp 470	aac Asn	acc Thr	act Thr	gtt Val	caa Gln 475	gct Ala	ctc Leu	aac Asn	tgt Cys	acc Thr 480	14	140
acc Thr	agt Ser	atc Ile	gac Asp	atc Ile 485	ttg Leu	agt Ser	tgt Cys	atg Met	aga Arg 490	aga Arg	gtc Val	gat Asp	ctc Leu	gcc Ala 495	act Thr	14	88
ctg Leu	atg Met	aac Asn	acg Thr 500	atc Ile	gag Glu	caa Gln	ctc Leu	gga Gly 505	ctt Leu	ggg Gly	ttt Phe	gag Glu	tac Tyr 510	acg Thr	ttg Leu	15	36
gac Asp	aac Asn	gta Val 515	acg Thr	gct Ala	gtg Val	tac Tyr	cgt Arg 520	tct Ser	gaa Glu	acg Thr	gct Ala	cgc Arg 525	acg Thr	act Thr	ggt Gly	15	84
gac Asp	att Ile 530	gct Ala	cgt Arg	gta Val	cct Pro	gtt Val 535	ctc Leu	gtc Val	ggg Gly	acg Thr	gtg Val 540	gcc Ala	aac Asn	gac Asp	gga Gly	16	32
ctt Leu 545	ctc Leu	ttt Phe	gtc Val	ctc Leu	ggg Gly 550	gag Glu	aat Asn	gac Asp	acc Thr	caa Gln 555	gca Ala	tat Tyr	ctc Leu	gag Glu	gag Glu 560	16	80
gca Ala	atc Ile	ccg Pro	aat Asn	cag Gln 565	ccc Pro	gac Asp	ctt Leu	tac Tyr	cag Gln 570	act Thr	ctc Leu	ctt Leu	gga Gly	gca Ala 575	tat Tyr	17	28
ccc Pro	att Ile	gga Gly	tcc Ser 580	cca Pro	gly	atc Ile	gga Gly	tcg Ser 585	cct Pro	caa Gln	gat Asp	cag Gln	att Ile 590	gcc Ala	gcc Ala	17	76
att Ile	gag Glu	acc Thr 595	gag Glu	gta Val	aga Arg	ttc Phe	cag Gln 600	tgt Cys	cct Pro	tct Ser	gcc Ala	atc Ile 605	gtg Val	gct Ala	cag Gln	18	24
gac Asp	tcc Ser 610	cgg Arg	aat Asn	cgg Arg	ggt Gly	atc Ile 615	cct Pro	tct Ser	tgg Trp	cgc Arg	tac Tyr 620	tac Tyr	tac Tyr	aat Asn	gcg Ala	18	72
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					caa Gln 710											2160
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					ggt Gly											2304
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					ttg Leu											2496
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												cca Pro				2928
												gca Ala				2976
			Ser					Val				aaa Lys 1005	Lys			3024
		Leu					Tyr					ttt Phe )				3072
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tat Tyr	agc Ser	aag Lys	ata Ile	gtc Val 1045	Phe	gta Val	tgg Trp	gac Asp	aag Lys 1050	Pro	tgg Trp	tgg Trp	cgc Arg	gaa Glu 1055	G1n	3168
ggc Gly	ttc Phe	tcg Ser	ggc Gly 1060	Val	ctc Leu	caa Gln	tcg Ser	agc Ser 1065	Cys	gac Asp	ccc Pro	atc Ile	tca Ser 1070	Phe	gcc Ala	3216
			Ser					Arg				att Ile 1085	Thr			3264
atg	gtc	gga	gac	ccg	gga	cgg	aag	tgg	tcc 51	caa	cag	tcc	aag	cag	gta	3312

Met	Val 109	Gly O	Asp	Pro	Gly	Arg 109		Trp	Ser	Gln	Gln 110		Lys	Gln	Val	
cga Arg 110	Gln	aag Lys	tct Ser	gtc Val	tgg Trp 111	Asp	caa Gln	ctc Leu	cgc Arg	gca Ala 111	Ala	tac Tyr	gag Glu	aac Asn	gcc Ala 1120	3360
Glà aaa	gcc Ala	caa Gln	gtc Val	cca Pro 112	Glu	ccg Pro	gcc Ala	aac Asn	gtg Val 113	Leu	gaa Glu	atc Ile	gag Glu	tgg Trp 113	Ser	3408
aag Lys	cag Gln	cag Gln	tat Tyr 114	Phe	caa Gln	gga Gly	gct Ala	ccg Pro 114	Ser	gcc Ala	gtc Val	tat Tyr	ggg Gly 115	Leu	aac Asn	3456
gat Asp	ctc Leu	atc Ile 115	Thr	ctg Leu	ggt Gly	tcg Ser	gcg Ala 116	Leu	aga Arg	acg Thr	ccg Pro	ttc Phe 116	Lys	agt Ser	gtt Val	3504
cat His	ttc Phe 117	gtt Val 0	gga Gly	acg Thr	gag Glu	acg Thr 117	Ser	tta Leu	gtt Val	tgg Trp	aaa Lys 118	Gly	tat Tyr	atg Met	gaa Glu	3552
ggg Gly 118	Ala	ata Ile	cga Arg	tcg Ser	ggt Gly 1190	Gln	cga Arg	ggt Gly	gct Ala	gca Ala 1195	Glu	gtt Val	gtg Val	gct Ala	agc Ser 1200	3600
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1 Thr Tyr Gly Leu	<pre> &lt;2   &lt;2   &lt;2   &lt;2   Ser   Arg   Glu   Leu   50</pre>	211> 212> 213> 400> Pro Leu Arg 35	PRT Unkr 29 Ile Leu 20 Asp	Leu 5 Leu Glu Pro	Gly Glu Gly Asn Ala	Tyr Asp Leu 55	Leu Lys 40 Pro	Glu 25 Trp	10 Glu Arg Tyr	Lys Asn Ile Ile	Tyr Lys Asp 60	Glu Lys 45 Gly	Glu 30 Phe Asp	15 His Glu Val	Leu Leu Lys Asn	
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1 Thr Tyr Gly Leu 65 Met	Ser Arg Glu Leu 50 Thr Leu	211> 212> 213> 400> Pro Leu Arg 35 Glu	1205 PRT Unkr 29 Ile Leu 20 Asp Phe Ser Gly Leu	Leu 5 Leu Glu Pro Met Cys 85	Gly Glu Gly Asn Ala 70 Pro	Tyr Asp Leu 55 Ile Lys	Leu Lys 40 Pro Ile Glu	Glu 25 Trp Tyr Arg Arg	10 Glu Arg Tyr Tyr Ala 90	Lys Asn Ile Ile 75 Glu	Tyr Lys Asp 60 Ala Ile	Glu Lys 45 Gly Asp Ser	Glu 30 Phe Asp Lys Met	15 His Glu Val His Leu 95	Leu Lys Asn 80 Glu	
1 Thr Tyr Gly Leu 65 Met	Ser Arg Glu Leu 50 Thr Leu Ala	211> 212> 213> 400> Pro Leu Arg 35 Glu Gln Gly Val	PRT Unkr 29 Ile Leu 20 Asp Phe Ser Gly Leu 100	Leu 5 Leu Glu Pro Met Cys 85 Asp	Gly Glu Gly Asn Ala 70 Pro Ile	Tyr Asp Leu 55 Ile Lys Arg	Leu Lys 40 Pro Ile Glu Tyr Val	Glu 25 Trp Tyr Arg Arg Gly 105	10 Glu Arg Tyr Tyr Ala 90 Val	Lys Asn Ile Ile 75 Glu Ser	Tyr Lys Asp 60 Ala Ile Arg	Glu Lys 45 Gly Asp Ser Ile Lys	Glu 30 Phe Asp Lys Met Ala 110	15 His Glu Val His Leu 95 Tyr	Leu Lys Asn 80 Glu Ser	
1 Thr Tyr Gly Leu 65 Met Gly Lys	Ser Arg Glu Leu 50 Thr Leu Ala Asp	211> 212> 213> 400> Pro Leu Arg 35 Glu Gln Gly Val	1205 PRT Unkr 29 Ile Leu 20 Asp Phe Ser Gly Leu 100 Glu	Leu 5 Leu Glu Pro Met Cys 85 Asp	Gly Glu Gly Asn Ala 70 Pro Ile Leu	Tyr Asp Leu 55 Ile Lys Arg Lys Asp	Leu Lys 40 Pro Ile Glu Tyr Val 120	Glu 25 Trp Tyr Arg Arg Gly 105 Asp	10 Glu Arg Tyr Tyr Ala 90 Val Phe	Lys Asn Ile Ile 75 Glu Ser Leu	Tyr Lys Asp 60 Ala Ile Arg Ser Lys	Glu Lys 45 Gly Asp Ser Ile Lys 125	Glu 30 Phe Asp Lys Met Ala 110 Leu	15 His Glu Val His Leu 95 Tyr	Leu Lys Asn 80 Glu Ser	
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Val Cys Phe Lys Lys Arg Ile Glu Ala Ile Pro Gln Ile Asp Lys Tyr
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Leu Lys Ser Ser Lys Tyr Ile Ala Trp Pro Leu Gln Gly Trp Gln Ala
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Val Gly Thr Thr Thr Thr Val Pro Gly Thr Thr Ala Thr Val Ser Glu
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Phe Leu Gly Val Pro Phe Ala Ala Ser Pro Thr Arg Phe Ala Pro Pro
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Asn Ser Phe His Leu Tyr Asp Gly Ala Ser Phe Ala Ala Asn Gln Asp
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Val Ile Ala Val Thr Ile Asn Tyr Arg Thr Asn Ile Leu Gly Phe Pro
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                                            380
Ala Ala Pro Gln Leu Pro Ile Thr Gln Arg Asn Leu Gly Phe Leu Asp
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                                        395
Gln Arg Phe Ala Leu Asp Trp Val Gln Arg Asn Ile Ala Ala Phe Gly
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Gly Asp Pro Arg Lys Val Thr Ile Phe Gly Gln Ser Ala Gly Gly Arg
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Ser Val Asp Val Leu Leu Thr Ser Met Pro His Asn Pro Pro Phe Arg
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Ala Ala Ile Met Glu Ser Gly Val Ala Asn Tyr Asn Phe Pro Lys Gly
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Pro Ala Thr Ile Asp Gln Arg Cys Ala Leu Tyr Thr Arg Tyr Tyr Thr
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Glu Leu Gly Thr Ile Ala Pro Arg Thr Phe Gly Gly Gly Ser Gly Gly
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                                                 830
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Pro Val Trp Ser Gln Leu Ile Glu Glu His Ser Leu Gln Asp Leu Lys
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Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser Asn Ile Phe
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Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys Thr Gly Met
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Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro Gly Ser Val
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Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn Ser Ile Leu Gly Tyr
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Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp Arg Glu Gln
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                                 1050
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Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr Gly Leu Asn
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                               1145
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                          1160
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His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly Tyr Met Glu
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Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser Lys Gln Val

1095

1090

48

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-	_				aat Asn						-		_	-		192	
		_		_	gcc Ala 70			_			-					240	
_	_			_	cca Pro			_	_				-			288	
-		_	_	~	att Ile	_			_	_	_		•		•	336	
	_		_		ctc Leu		_	-			-	_			_	384	
					gaa Glu											432	
	-		_		cat His 150		_		_	_		-	-		_	480	
-	-			_	gac Asp		_	_	_	_						528	
-	-				cgt Arg		-	_					_	_		576	
					tat Tyr											624	
_					gac Asp					_		-	-	_	_	672	
		_	_		acg Thr 230	-		_	-	-			_	_		720	
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Gln	Val	Gln	Gly	Leu 245	Ala	Gly	Asp	Val	Met 250	Ser	Phe	Arg	Gly	Ile 255	Pro	
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_					ggc Gly											864
					tat Tyr											912
					tac Tyr 310											960
					gtc Val										-	1008
					atg Met											1056
			-		gtg Val	-					~			_		1104
		-			ggt Gly		_	_		-					_	1152
_					ctc Leu 390	-			-	-				-	_	1200
					ttc Phe											1248
					gcg Ala											1296
					ttc Phe											1344
					acg Thr											1392
					tcg Ser 470											1440

												gac Asp				1488
												ctg Leu				1536
												gtt Val 525				1584
												ggg Gly				1632
												gcg Ala				1680
												gac Asp				1728
							_				-	aat Asn	-			1776
												cag Gln 605				1824
												gga Gly				1872
												gtg Val				1920
												ccc Pro				1968
			-			_	-			-		gtc Val			•	2016
_			-		-		_	_				cct Pro 685	_			2064
												cgc Arg				2112
gtg	tcg	CCC	gga	cct	tcc	atc	CCC	cct	tgc 58	gcg	gat	ggc	gcc	aag	gcg	2160

Val 705	Ser	Pro	Gly	Pro	Ser 710	Ile	Pro	Pro	Cys	Ala 715	Asp	Gly	Ala	Lys	Ala 720	
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											agc Ser					2256
											ctc Leu					2304
											caa Gln 780					2352
											atc Ile					2400
											cat His					2443
			-								gca Ala		_			2496
											agc Ser					2544
											cag Gln 860					2592
											gcg Ala					2640
											cta Leu					2688
											ctg Leu					2736
											tac Tyr					2784
											gac Asp 940					2832

	cga Arg															2880
	ctt Leu															2928
	cag Gln															2976
	cga Arg		Lys					Ser					Leu			3024
	ttg Leu 101	Thr					Leu					Gln				3072
	aat Asn 5					Tyr					Val					3120
	ccg Pro				Glu					Gly					Ser	3168
	gac Asp			Ser					Thr					Asp		3216
	tgg Trp		Ile					Val					Arg			3264
	caa Gln 1090	Gln					Arg					Trp				3312
cgc Arg 110	gca Ala 5	gcc Ala	tac Tyr	gag Glu	aac Asn 111(	Ala	ggg Gly	gcc Ala	caa Gln	gtc Val 1115	Pro	gag Glu	ccg Pro	gcc Ala	aac Asn 1120	3360
	ctc Leu				Trp					Tyr					Pro	3408
	gcc Ala			Gly					Ile					Ala		3456
	acg Thr		Phe					Phe					Thr			3504
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Gly Leu Glu Phe Pro Asn Leu Pro Tyr Tyr Ile Asp Gly Asp Val Lys
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Leu Thr Gln Ser Met Ala Ile Ile Arg Tyr Ile Ala Asp Lys His Asn
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Met Leu Gly Gly Cys Pro Lys Glu Arg Ala Glu Ile Ser Met Leu Glu
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Gly Ala Val Leu Asp Ile Arg Tyr Gly Val Ser Arg Ile Ala Tyr Ser
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Lys Asp Phe Glu Thr Leu Lys Val Asp Phe Leu Ser Lys Leu Pro Glu
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Met Leu Lys Met Phe Glu Asp Arg Leu Cys His Lys Thr Tyr Leu Asn
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Gly Asp His Val Thr His Pro Asp Phe Met Leu Tyr Asp Ala Leu Asp
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Val Val Leu Tyr Met Asp Pro Met Cys Leu Asp Ala Phe Pro Lys Leu
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                                   170
Val Cys Phe Lys Lys Arg Ile Glu Ala Ile Pro Gln Ile Asp Lys Tyr
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Leu Lys Ser Ser Lys Tyr Ile Ala Trp Pro Leu Gln Gly Trp Gln Ala
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Gly Ser Pro Glu Phe Thr Asp Phe Pro Val Arg Arg Thr Asp Leu Gly
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Gln Val Gln Gly Leu Ala Gly Asp Val Met Ser Phe Arg Gly Ile Pro
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Tyr Ala Ala Pro Pro Val Gly Gly Leu Arg Trp Lys Pro Pro Gln His
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Ser Glu Asp Cys Leu Tyr Leu Asn Val Trp Ala Pro Ser Gly Ala Lys
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Pro Gly Gln Tyr Pro Val Met Val Trp Val Tyr Gly Gly Phe Ala
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Gly Gly Thr Ala Ala Met Pro Tyr Tyr Asp Gly Glu Ala Leu Ala Arg
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345

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Ser Asn Ala Arg Ala Phe Gly Gly Asp Pro Gly Arg Val Thr Val Phe
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Thr Arg Pro Leu Ala Thr Leu Ala Asp Ser Ala Ala Ser Gly Glu Arg
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Asp Ser Ala Ala Ile Ala Ala Gly Gln Leu Ala Pro Val Arg Val Leu
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Arg Gly Val Ser Ala Phe Ser Glu Ala Leu Val Arg Gln Gly Ala Pro
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Ala Thr His Gly Ala Glu Ile Pro Tyr Val Phe Gly Val Phe Lys Leu
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Asp Arg Ala Leu Gly Gln Leu Met Ser Ser Ala Trp Val Arg Phe Ala
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Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Lys Asp Asn
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Met Asp Arg Val Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly
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Arg Thr Thr Ile Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn
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Gln Ser Glu Val Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu
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Thr Thr Thr Ala Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala
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Ser Ala Leu Ala Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu
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                               875
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Val Leu Gly Val Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu
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                                910
Ala His Glu Ile Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala
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                            925
Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly Gln Tyr
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tcc Ser	aga Arg	ttg Leu	ttt Phe	gaa Glu	aga Arg	ttt Phe	cat His	ttg Leu	gag Glu <b>64</b>	ggc Gly	gag Glu	ctc Leu	cag Gln	agg Arg	acg Thr	672	2

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1740

1800

1850

1920

1929

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			Ser	245					250					255	
			Val 260					265					270		
		275	Ser				280					285			
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			Ala 420					425					430		
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			Gly	485					490					495	
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380

395

375

390

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cagcatag
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	130					135		Thr			140			_	
Val 145	Val	Val	Gly	Ala	Gly 150	Leu	Ser	Gly	Leu	Glu 155	Thr	Ala	Arg	Lys	Val 160
				165				Val	170				_	175	
			180					Ser 185					190		
		195					200	Asp				205			_
	210					215		Gly			220				_
225					230			Gly		235					240
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Ser	Pro	Gln 275	Ala	Lys	Gln	Leu	Asp 280	Ser	Val	Ser	Phe	Ala 285	His	Tyr	Cys
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gageeeteaa gegaageage tegacagtgt gagettegea cactactgtg agaaggatet
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taatattgtc tcggataaga aagacggtgg gcagtatatg cgatgcaaaa caggtgcgtg
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cagcatag
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<211> 591

<212> PRT

<213> Rhinocladiella atrovirens

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Lys Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr Thr
                        215
Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala Pro
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                                       235
Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala Glu
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Leu Leu Pro Ala Trp Ser Gln Leu Ile Glu Glu His Ser Leu Glu Asp
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           260
Pro Lys Ala Ser Pro Gln Ala Lys Gln Leu Asp Ser Val Ser Phe Ala
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                           280
                                               285
His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Gly Val Ala
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                                           300
Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile Ser
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                                        315
Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser Asn
                325
                                    330
Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys Thr
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                                                    350
Gly Met Gln Ser Leu Cys His Ala Met Ser Lys Glu Leu Val Pro Gly
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Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala Ser
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                       375
Gly Cys Thr Val Arg Ser Ala Ser Gly Gly Val Phe Arg Ser Lys Lys
                   390
                                       395
Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Ile Phe Ser Pro Leu
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               405
                                   410
Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile Gly Tyr Tyr Ser
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Lys Ile Val Phe Val Asp Lys Leu Trp Trp Arg Glu Gln Gly Phe Ser
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Gly Val Leu Gln Ser Ser Cys Asp Pro Ile Ser Phe Ala Arg Asp Thr
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Ser Ile Glu Val Asp Arg Gln Ser Ile Thr Cys Phe Met Val Gly Asp
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Pro Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val
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Trp Asn Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly Ala Gln Val Pro
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Glu Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe
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Gln Ala Pro Ser Ala Val Tyr Gly Leu Asn Cys Leu Asn Thr Leu Gly
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                                            540
Ser Ala Leu Arg Thr Pro Phe Lys Gly Val His Phe Val Gly Thr Glu
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Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Val Thr Lys Leu Asn Tyr
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                                       75
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                                   90
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100
                               105
Pro Val Ser Ala Leu Ser Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
       115
                            120
                                               125
Thr Ala Leu Val Pro Gly His Thr Thr Pro Asp Asn Val Ala Asp Val
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Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
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                                        155
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
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                                    170
                                                        175
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
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Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
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Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Ala
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                                       235
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
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                                   250
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu His Ser Leu Gln
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                               265
Asp Leu Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
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                            280
                                                285
Ala His Tyr Cys Glu Lys Glu Leu Asn Leu Pro Ala Val Leu Gly Val
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                                            300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
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Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
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Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
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                               345
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
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Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
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Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
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Lys Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
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Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn Ser Ile
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Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
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Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
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                                           460
Ser Phe Ala Arg Asp Thr Ser Ile Asp Val Asp Arg Gln Trp Ser Ile
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Glu	Asn	Ala 515	Gly	Ala	Gln	Val	Pro 520	Glu	Pro	Ala	Asn	Val 525	Leu	Glu	Ile	
Glu	Trp 530	Ser	Lys	Gln	Gln	Tyr 535	Phe	Gln	Gly	Ala	Pro 540	Ser	Ala	Val	Туг	
Gly 545	Leu	Asn	Asp	Leu	Ile 550	Thr	Leu	Gly	Ser	Ala 555	Leu	Arg	Thr	Pro	Phe 560	
Lys	Ser	Val	His	Phe 565	Val	Gly	Thr	Glu	Thr 570	Ser	Leu	Val	Trp	Lys 575	Gly	
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	<2	220> 221> 222>		( [	1392)	)										
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		acg Thr														96
	Glu	gcg Ala 35	Met		Arg	Val	Gly	Gly	Lys	Thr	Leu		Val			144
		ggc Gly														192
gac Asp 65	agc Ser	aac Asn	caa Gln	agc Ser	gaa Glu 70	gta Val	tcc Ser	aga Arg	ttg Leu	ttt Phe 75	gaa Glu	aga Arg	ttt Phe	cat His	ttg Leu 80	240
		gag Glu														288
		aca Thr														336
gaq	gtt	gca	agt	gca	ctt	gcg	gaa	ctc	ctc	ccc	gta	tgg	tct	cag	ctg	384

Glu	Val	Ala 115	Ser	Ala	Leu	Ala	Glu 120	Leu	Leu	Pro	Val	Trp 125	Ser	Gln	Leu	
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		_	_	-	-					-	gag Glu	_				480
											aca Thr					528
											ctc Leu					576
~	-	_				_				_	gac Asp	-				624
											tcg Ser 220					672
_		_	-		-						ctc Leu					720
											gta Val					768
											tcg Ser				_	816
											ccc Pro					864
											agc Ser 300			_		912
											ttc Phe					960
											gat Asp					1008
											gtc Val					1056

cgg aag tg Arg Lys T: 3			_		_	_	_	_		_		_		1104
gac caa c Asp Gln La 370														1152
ccg gcc a Pro Ala A 385			-				-	_	_	_				1200
gga gct co Gly Ala P		_												1248
teg geg e Ser Ala L	_	~	~		_	~	-			_		_		1296
acg tct t Thr Ser Lo														1344
caa cga gg Gln Arg G 450													tag *	1392
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Leu Pro Ala Val Leu Gly Val Ala Asn Gln Ile Thr Arg Ala Leu Leu
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Gly Val Glu Ala His Glu Ile Ser Met Leu Phe Leu Thr Asp Tyr Ile
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Lys Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly
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Gly Gln Tyr Met Arg Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala
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Met Ser Lys Glu Leu Val Pro Gly Ser Val His Leu Asn Thr Pro Val
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Ala Glu Ile Glu Gln Ser Ala Ser Gly Cys Thr Val Arg Ser Ala Ser
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Gly Ala Val Phe Arg Ser Lys Lys Val Val Val Ser Leu Pro Thr Thr
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                                        270
Leu Tyr Pro Thr Leu Thr Phe Ser Pro Pro Leu Pro Ala Glu Lys Gln
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Ala Leu Ala Glu Asn Ser Ile Leu Gly Tyr Tyr Ser Lys Ile Val Phe
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Val Trp Asp Lys Pro Trp Trp Arg Glu Gln Gly Phe Ser Gly Val Leu
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Gln Ser Ser Ser Asp Pro Ile Ser Phe Ala Arg Asp Thr Ser Ile Asp
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Val Asp Arg Gln Trp Ser Ile Thr Cys Phe Met Val Gly Asp Pro Gly
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Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp
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Asp Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly Ala Gln Val Pro Glu
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Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
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                                       395
Gly Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly
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                                   410
Ser Ala Leu Arg Thr Pro Phe Lys Ser Val His Phe Val Gly Thr Glu
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Thr Ser Leu Val Trp Lys Gly Tyr Met Glu Gly Ala Ile Arg Ser Gly
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Gln Arg Gly Ala Ala Glu Val Val Ala Ser Leu Val Pro Ala Ala
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ttg gag acg gca cgc aaa gtc cag gcc gcc ggt ctg tcc tgc ctc gtt
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Leu Glu Thr Ala Arg Lys Val Gln Ala Ala Gly Leu Ser Cys Leu Val
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_	-			-	-	_		-	ttg Leu		_	_			-	240
				_		-			aat Asn 90							288
									ggt Gly							336
									ctc Leu							38.1
	-	-		_			_		aag Lys	-	_		_			432
									tac Tyr							480
									cag Gln 170							528
	Val	Glu	Ala	His	Glu	Ile	Ser	Met	ctt Leu	Phe	Leu	Thr		Tyr		576
									ttc Phe							624
									atg Met							672
									gtg Val							720
									tgt Cys 250							768

		gtg Val		_	-	_			_	_		_			816
		ccc Pro 275									_		_		864
_	-	gcg Ala	-			-				_	_		_		912
_		gac Asp	_	_		 -	-				-		-		960
	-	agc Ser		-				-	-	-		_		-	1008
		cga Arg													1056
	-	tgg Trp 355			_	-	-	-	-		-		-		1104
-		ctc Leu	_	-	_			_		-		-			1152
_	_	aac Asn			_			_	_	_	_				1200
	-	ccg Pro	_	_	-		_		-				_		1248
		ctc Leu	-			_	-				-				1296
		tta Leu 435	_				_	-		_		-	_		1344
		ggt Gly												tag *	1392

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<sup>&</sup>lt;213> Unknown

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_		_	-			~	-		-			_	-	ctg Leu 175		528
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														gac Asp		624
														cat His		672
_		_	-		_									ccc Pro		720
_	~			_	_	_			-		_	_	_	gcc Ala 255	-	768
	-			_	_		-	-	-	_	_		_	aca Thr		816
_				_								_		aag Lys		864
														gtc Val		912
-		-	-	-			_	_				_		gtc Val		960
	_	_		_					-	_	-		-	atc Ile 335	_	1008
_	_													ccg Pro		1056
	_				_		_	_	-	-		_		gtc Val		1104
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_	_				_				_	_	_	_		ttc Phe		1200

385					390					395					400	
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								agt Ser 425								1296
								atg Met								1344
								gct Ala							tag *	1392
	<: <: <:	220>	463 PRT Unkr		APA(	); re	svoms	al of	€ су:	steir	nes í	L69,	359	, an∢	Ē	
		100>										_				
Lys 1	Asp	Asn	Val	Ala 5	Asp	Val	Val	Val	Val 10	Gly	Ala	Gly	Leu	Ser 15	Gly	
Leu	Glu	Thr	Ala 20	Arg	Lys	Val	Gln	Ala 25	Ala	Gly	Leu	Ser	Ser 30	Leu	Val	
Leu	Glu	Ala 35	Met	Asp	Arg	Val	Gly 40	Gly	Lys	Thr	Leu	Ser 45	Val	Gln	Ser	
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Arg	130 Leu	Asp	Ser	Val		135 Phe	Ala	His	Tyr			Lys	Glu	Leu		
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Gly	Val	Glu	Ala	165 His	Glu	Ile	Ser	Met	170 Leu	Phe	Leu	Thr	Asp	175 Tyr	Ile	
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_		195					200	Gly				205				
	210	_				215					220					
мет	ser	ьуs	GLU	ьeu	val	P1.0	στλ	Ser	92	птр	ьеи	ASII	TIII	LT O	val	

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Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
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